

September 16, 1961

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# SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE



"Corridor Museum"

See Page 191

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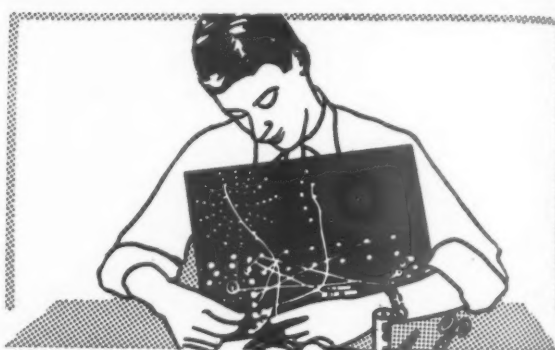
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## PUBLIC SAFETY

# Nuclear Testing Resumed

► THE RESUMPTION of Russian nuclear testing poses another problem besides the threat of war: the dangers of radioactive fallout.

The threatened testing of a 100 megaton nuclear bomb—5,000 times more powerful than the Hiroshima bomb—could dump more than five tons of intensely radioactive debris into the earth's atmosphere. Most of the radioactive particles would be swept by winds to all corners of the earth.

The earth's atmosphere is still recovering from the extensive nuclear testing concluded in late 1958, which marked the beginning of the informal moratorium. The following spring the largest amount of radioactive fallout rained down from the sky.

Although the United States has also announced plans to resume nuclear testing, the tests will be conducted underground where radiation contamination is at a minimum. The most powerful United States bomb is somewhere in the range of 20 megatons.

The Russian atomic bombs exploded this fall will produce a large fallout in the spring. The amount of radioactive pollution depends upon the size of the bomb, the height of the explosion and weather conditions.

Heavier radioactive particles created in the explosion fall near the Russian test site. The lighter particles are carried by winds in an easterly direction over most parts of the Northern Hemisphere. They can then be deposited by rains within a few days. Large explosions hurl radioactive particles up into the stratosphere where they remain for months or years before falling back to the earth.

The highest levels of fallout occur in the Northern Hemisphere between 40 and 50 degrees latitude. In the United States, the area is roughly north of a line passing through Philadelphia and north of Kansas City and San Francisco.

Fallout includes many particles, such as strontium-90, that lose their radioactivity very slowly. The particles are washed by rains into the soil, eventually reaching the foods humans eat.

Sufficient amounts of radiation can damage or kill human cells. Many scientists are worried about the radiation's effect on future generations because of its damage to the body's reproductive cells.

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## Aim for Neutron Bomb

► A NEUTRON BOMB, which has been widely discussed but so far as known does not exist, may be developed through resumed nuclear testing by Russia or the United States.

It would be thermonuclear hydrogen-fusion in character, but without the fallout of the H-bomb. The unsolved trick is

how to set it off without aid of a fission bomb which is the necessary trigger of an H-bomb, causing the release of strontium-90 and other radioactivity.

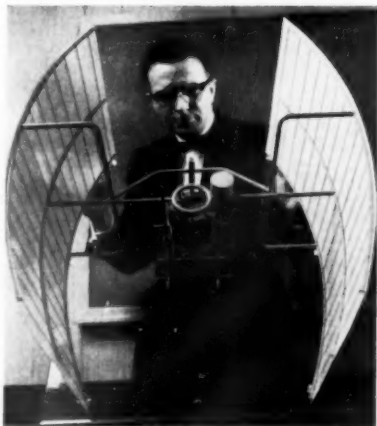
If such a fusion bomb of small size could be made, it is suggested that it could be exploded high above a military or other target, producing a limited blast with little contamination, but a burst of high-voltage neutrons killing to human and other life, leaving buildings relatively intact and not poisoning the countryside. This would be very useful in military operations.

This principle of the neutron bomb is no secret. The progress made by scientists on both sides of the Iron Curtain is not known.

Some of the methods of starting a controlled thermonuclear reaction that could be used for the peaceful production of nuclear power might be applied to a neutron bomb. Experts of various nations gathered at Salzburg, Austria, Sept. 4-9, to discuss controlled nuclear fission research. The electromagnetic methods of walling in extremely hot electrified mixtures of light hydrogen, called plasma, possibly could be used to create concentration of heat and set off the explosion.

Some discussion has visualized neutron bombs being used in space to produce a blast of the all-pervading particles that could destroy a missile by heating it intensely and melting it.

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**NUCLEAR POWER SYSTEM**—A nuclear thermoelectric system that could power instruments gathering scientific data on the moon has been developed by the aerospace electrical department of Westinghouse, Lima, Ohio. Niles F. Schub shows a model of the system using spontaneous decay of a radioisotope to produce heat which is converted into electricity. The curved shields are waste heat radiators.

## Taming H-Bomb Nearer

► DUE TO NEW THEORIES that were presented to the Salzburg, Austria, conference on taming H-bomb power for useful work, the long-sought breakthrough may be closer than hitherto imagined.

United States and Soviet laboratories studies showed that there is a chance of controlling the oscillations in the plasma or ionized gas that is held in a magnetic field so that it can cause the fusion of light element atoms and give off energy non-explosively. At the 1958 Geneva conference it was felt that thermonuclear harnessing might not be possible, and that the plasma would be destroyed before it is heated to the 400 million degrees or more required to ignite the controlled fusion reaction.

The new theory showing these apprehensions are largely unfounded was presented by William E. Drummond of General Atomics Fusion Laboratory, San Diego, Calif. Russian scientists reported a similar conclusion.

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## Small Atom Bomb

► THE PERFECTING of a small atom bomb that could be used like conventional heavy artillery will probably be a first objective of the underground atomic testing to be undertaken by the United States.

If there has been theoretical progress toward setting off an H-bomb without exploding a fission bomb as an igniter, creating the so-called neutron bomb, this may also be tried.

Because the explosions would be underground, there would be opportunity to try out atomic explosions for chemical processing deep in the earth and for the release of oil from oil sands as has been proposed from time to time.

The Project Gnome which will explode a 10-kiloton device in a dry salt deposit near Carlsbad, N. M., to produce power will probably also be undertaken. Water will be pumped into the explosion zone deep in the earth and steam drawn off to run generators.

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## Fallout Hits in Four Days

► RADIOACTIVE fallout from Soviet nuclear tests can be expected in United States mainland water supplies within four to seven days after the test. It hits the Aleutian Islands first, then Alaska.

Fallout from previous Soviet tests has reached the U. S. usually within four to five days.

Dr. George Anton of the Atomic Energy Commission's fallout studies branch said that strontium-90 would not show up in the milk supply for a few weeks. It takes that long for this fallout product to settle on the plants, be eaten by a cow and get into the milk.

Shorter-lived decay products from the fallout can be detected sooner than the

strontium-90, he said, partly because the methods used to detect them are simpler.

The prevailing winds carrying the radioactive fallout at the time of the first test on Sept. 1 had a pattern heading eastward from the Lake Baikal region, then dipping southward into Manchuria. From there they

headed northeastward toward the Japanese island of Hokkaido.

After heading toward the open ocean, the winds, picking up speed, went toward southern Kamchatka, then westward to the Aleutian island chain.

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## PHYSICS

# H-Bomb Research "Bottle"

► THE MASSACHUSETTS Institute of Technology has reported that a new kind of magnetic bottle will be built in its laboratories. Proposed by a graduate student, it may show how a major obstacle to the development of thermonuclear power plants can be removed.

Thermonuclear reactions, such as occur in the H-bomb, explain the tremendous energy of the sun and stars, but thus far have not been controllable on earth. Both in this country and abroad, magnetic containers of various shapes are being studied. But the better a container is, the harder it is to put the necessary fuel inside of it.

The desired reactions occur between isotopes of hydrogen at extremely high temperatures. Physicists call such a fuel a plasma. In a doctoral thesis written at MIT, Air Force Capt. R. C. Wingerson has proposed the use of a corkscrew-shaped magnetic field to overcome the difficulty and trap plasma in a magnetic container long enough for atomic nuclei to fuse and release energy.

Experimental apparatus embodying Capt. Wingerson's idea will be built by James S. Tulenko, another MIT graduate student, under the supervision of David J. Rose, professor of nuclear engineering. Prof. Rose believes Capt. Wingerson has found a solution to a problem with which nuclear engineers have grappled for the last decade.

One of the various types of bottles which they have studied consists of a long pipe, the walls of which are a magnetic field created by an electrical coil around it. The ends of this pipe are open but "mirror" magnetic fields are set up there to serve as stoppers. The Russian physicist, K. D. Sinel'nikov, proposed two years ago that an undulating field be used to fill and trap plasma in such a bottle. The Wingerson

corkscrew effects should be more effective.

By making a magnetic field spiral like a drill, Capt. Wingerson's computations show, a beam of particles shot into the tube along its axis with a certain energy can be wound up or unwound. In other words, some of their longitudinal energy can be transformed into perpendicular energy. The mirrors then can be more effective, and more particles retained in the tube for sufficient time.

In effect, the device that will be built at MIT will be similar to a lobster trap. It should be easy for a particle to get into the thing, but difficult for it to escape because of the trap's geometrical configuration. The walls of this trap are to be complex magnetic fields created by an axial coil and mirrors, and the entrance will be determined by the corkscrew fields.

The experimental trap that Mr. Tulenko is designing will be eight feet long and will be used to hold electrons. The ionic charged particles needed for a thermonuclear reaction to occur are relatively heavy, and would necessitate a structure between 50 and 100 feet long. But Mr. Tulenko's device will be a scale model of a larger device.

Large-scale experimental machines of many types already have been built. MIT scientists have maintained, however, that the first step should be to acquire more fundamental knowledge of the nature of plasmas, their instabilities, and their behavior in magnetic fields.

Additional preliminary research inspired by Capt. Wingerson's discovery already is under way in the Atomic Energy Commission's Los Alamos Scientific Laboratory. It was described at an international conference on plasma physics and controlled nuclear fusion research in Salzburg, Austria.

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## PUBLIC SAFETY

# Local Fallout Worst

► IT IS LOCAL fallout that we should worry most about—rather than the world-wide variety circling the earth.

This is the belief of Dr. Willard F. Libby, professor of chemistry at the University of California, Los Angeles, a former member of the U. S. Atomic Energy Commission and 1960 Nobel Prize winner in Chemistry.

He divides fallout from nuclear explosions into three main types—local, tropospheric and stratospheric.

The intense local fallout comes down

quickly and in heavy doses, generally over an area 200 to 300 miles downwind from the bomb-burst. As much as 80% of the total fallout may come down within the first few hours after an explosion.

In past nuclear tests, local fallout has been carefully controlled, but in a nuclear war it could represent the greatest danger to the civilian population. The danger can be largely countered by a nation-wide shelter program, Dr. Libby believes. Radioactive particles which are too fine to be

caught in the local fallout start circling around the earth on one of two levels depending on the power of the bomb and the height of its mushroom cloud.

As a rough rule, the fine particles from an atom bomb explosion are carried in the troposphere, the lower part of the atmosphere, in a fairly narrow earth-circling band of air, and come down inside a month.

Fine particles from the more powerful H-bomb explosions, with mushroom clouds pushing above 40,000 feet, are picked up by air masses of the stratosphere.

These particles circle the entire earth for about five years, losing most of their radioactivity, before coming down through gradual mixing with the lower tropospheric air.

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## BIOCHEMISTRY

# Cancer May Be a Mistake

**Cancer may be the mistake of a virus that can fool a normal cell into reproducing virus. However, sometimes defective and abnormal cells result instead.**

► **CANCER** may be a mistake of a virus, scientists were told at the American Chemical Society meeting in Chicago.

A virus is a very complicated chemical compound with two parts: the nucleic acid, which has the reproducing information, and the protective coating, which is made of protein. Dr. M. P. Gordon, University of Washington, told the meeting. The nucleic acid of the virus is almost identical with the nucleic acid of the cell it infects, and the virus can fool the cell into using virus nucleic acid and reproducing virus, he said. The deception does not always work, however, and the infected cell may produce defective and abnormal cells instead of viruses.

Scientists can now fool the virus, Dr. Gordon reported. They change the chemistry of the nucleic acid with similar chemicals, called analogues, and make the virus less effective. In some cases, the analogues prevent the virus from infecting the cell altogether.

When the analogue of an amino acid, 5-fluorouracil, is incorporated into the simple plant virus, tobacco mosaic virus, the virus has difficulty infecting new cells and is more susceptible to certain chemical agents, Dr. Gordon said. The virus also becomes more sensitive to the type of radiation used in tumor treatment.

"It is generally found that compounds incorporated into nucleic acids also inhibit the multiplication of viruses in infected tissues," Dr. Gordon continued. "They are often non-infectious or their ability to initiate infections and transfer genetic information to other cells is reduced. The genetic message carried by the virus is often garbled, resulting in mutants."

Nucleic acids that contain analogues are also more sensitive toward the action of a variety of physical and chemical treatments. This is the basis of cancer chemotherapy, Dr. Gordon concluded.

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## Test to Help Extend Life

► **A CHEMICAL TEST** may help extend life for a substantial proportion of the population, Dr. Herbert L. Davis of the University of Nebraska reported. Details of the test procedure were reported at the American Chemical Society's 140th national meeting in Chicago.

The test measures the total fats in the blood stream. It is expected to provide a screening procedure for patients suspected of having arteriosclerosis and other disorders of digestion and utilization of fats. Conspicuously high values in the test would justify further procedures to determine the

separate kinds of fats present, he indicated.

The results will show the effects of exercise, reduced fats in the diet, substitution of polyunsaturated fats for the saturated ones and the use of various drugs, Dr. Davis said.

It is hoped that screening for total liquids may become as common and as valuable as the X-ray test for tuberculosis, Dr. Davis said.

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## Drinking Water Safe

► **A NUCLEAR WAR** will not permanently contaminate our water supply, scientists were told at the American Chemical Society meeting in Chicago.

A mobile water purification unit has been developed that removes 90% of the plutonium in contaminated water at the rate of 1,500 gallons of water per hour, Maurice Pressman, U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va., said.

Although the amount of pollution from a nuclear attack or an accident in an atomic plant is uncertain, the equipment is believed to be capable of reducing contamination to the level set by the National Committee on Radiation Protection as safe during a 30-day emergency period.

Plutonium, used as an explosive component of nuclear weapons and as a fuel for nuclear reactors, is now in large-scale production in the United States. If the element gets into the body, it tends to concentrate in the bones and can cause tumors or injure the sensitive bone marrow, site of most blood cell formation.

The purification equipment, stored in a van-type object on a two and a half ton truck, can be put into operation within an hour after arrival at the emergency site, it was reported.

Normally, the unit removes 72% of the contamination. By making the water very alkaline, this can be increased to 97.5% in an emergency. Neutralization with acid would then make the water safe and drinkable, Mr. Pressman concluded.

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## MEDICINE

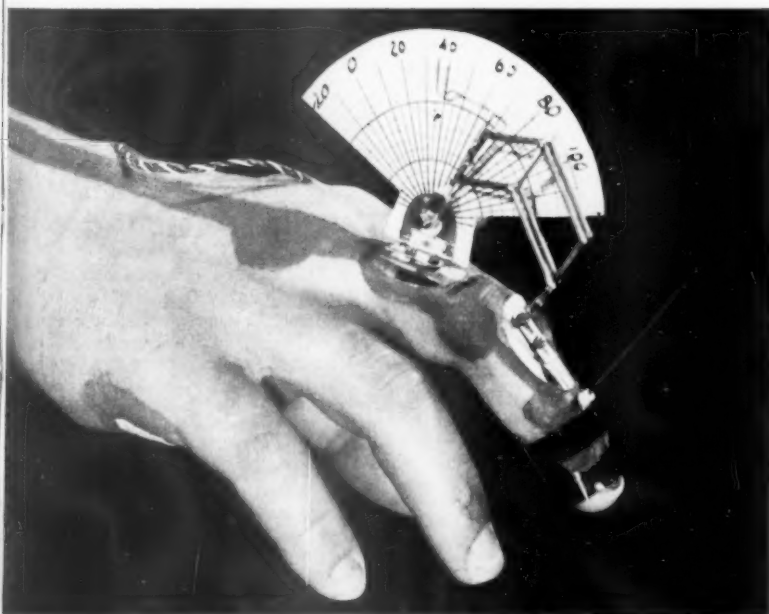
## Device Used to Measure Slightest Finger Wiggle

► **A DEVICE** that measures the slightest wiggle of a finger has been developed by research teams working under Prof. James B. Reswick of the Case Institute of Technology and Dr. Charles Long of Highland View Hospital, Cleveland, Ohio.

The electrogoniometer, or elgon, uses hair-fine electrodes to pick up minute electrical impulses in the finger muscles. These impulses are then magnified and a complete record is made of finger position as various joints bend during motion.

The elgon, designed by Keith Marquardt, a senior student at Case's design center, will be particularly useful in determining how much manipulating ability has been lost in patients who have had strokes or are arthritic.

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**FINGER WIGGLE RECORDER**—The electrogoniometer records finger position when hand is in motion.

## PSYCHOLOGY

# Aldous Has "Personality"

► ALDOUS, an electronic "personality," was introduced to the American Psychological Association meeting in New York by Dr. John C. Loehlin of the University of Nebraska.

Aldous, named by Dr. Loehlin for Aldous Huxley, the writer, author of "Brave New World" among other novels, was created as a model of human personality. Actually Aldous is really only an electronic computer or, more precisely, a set of coded instructions punched in paper tape called by scientists a "program." The tape works like the old-fashioned player piano roll and tells Aldous how to behave.

Aldous, the psychologists learned, can profit from experience, or learn. He can forget, love, fear and be angry.

In a new situation, Aldous can recognize what he confronts. He responds with an appropriate emotion. This can be a positive

emotion, such as love, desire or attraction, or it can be one of two negative emotions, anger or fear.

Aldous' emotional reaction depends on both his current mood (that is, a persistence of his emotions from the immediately preceding situation) and his memories of what happened in related situations in the past.

On the basis of his emotional reaction, Aldous acts. He may approach affectionately, attack or withdraw—in each case by printing a number symbolizing that behavior.

Dr. Loehlin has investigated, he reported, bringing Aldous up in "benign" and "hostile" worlds and what happens when Aldous is shifted from one to the other.

Worst fault of Aldous, Dr. Loehlin said, is his lack of initiative. He also lacks an unconscious.

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## SOCIOLOGY

# Fraternity Drinking High

► COLLEGE FRATERNITIES are "a teaching mechanism for drinking" and a stronger influence than religious affiliation in regulating the drinking habits of their members, a University of Illinois sociologist asserts.

Prof. Joseph R. Gusfield bases his opinion on the drinking done by 185 of the 700 male students at an eastern school he calls "Canterbury College." An old, privately endowed liberal arts college, Canterbury charges high tuition and draws most of its students "from upper economic and social levels," he states.

Prof. Gusfield's sampling includes 126 fraternity members and 57 "independents." Among them were 95 protestants, 49 Jews and 29 Catholics.

In the entire roster, only five total abstainers were found, confirming Canterbury's reputation as a "heavy-drinking school."

Prof. Gusfield classed those who reported drinking beer twice a week or more as "high users." Among the fraternity men, 60% qualified. Only 32% of nonmembers made the list.

Rated by religious affiliation 63% of the protestants, 29% of the Jews and 66% of the Catholics qualified as high users. In fraternities, however, the number of high users rose to 73% among protestants and 36% among Jewish students. For Catholics in fraternities, the percentage of high users was the same as that recorded for all Catholic students in the survey.

High-user "independents" comprised only 34% of the protestants, 23% of the Jews and 50% of the Catholics.

Prof. Gusfield also classed 42% of all protestant students, 35% of all Jewish students and 63% of all Catholic students as

"high abusers." They admitted getting "high, tight or drunk" twice or more each month.

For fraternity members, the number of high-abuser protestants and Jews climbed to 52% and 48%, respectively. Among nonmembers, it decreased to 13% for protestants and 23% for Jews. For Catholics, the percentage was the same (63%) for members as for nonmembers.

Among Jewish students, normally the lightest drinkers among the three religious groups, the share of fraternity members who were high abusers (48%) was much higher than the share of protestant "independents" who were high abusers (13%).

Of the 40 students who said they first used alcohol excessively after entering college, 75% reported having their first such experience at a fraternity party, Prof. Gusfield points out in the current Quarterly Journal of Studies on Alcohol, 22:428, 1961, published at Yale University, New Haven, Conn.

His findings are in line with the theory that heavier drinkers may be recruited deliberately for fraternity membership, while lighter drinkers are kept out.

"The sober facts of social differentiation channelize the opportunities for drunkenness," he comments. He found that very few students drank alone, but usually in company with fraternity brothers, "dates," and friends of both sexes.

Canterbury has a pattern of one or two "elite" fraternities setting a brisk drinking pace for others to follow. This pattern, he said, "may not exist so clearly elsewhere, as in new colleges, denominational colleges, or large state or private universities."

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## More Likely to Volunteer

► THE OLDEST CHILD in a family is more vulnerable to the appeal of a recruiter and is more likely to volunteer to serve as a "guinea pig" in a small group experiment, Drs. Paul C. Capra and James E. Dittes of Yale University reported to the meeting of the American Psychological Association in New York.

At Yale, an advanced student was sent through the freshman dormitories to solicit volunteers for a small group experiment. One hundred freshmen were solicited. After a student had agreed or declined to serve as a subject, birth order information was obtained.

Of the students who were the first-born in their families, 36% volunteered. Of the students who were younger children in their families, only 18% volunteered.

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## 30 Can Live in Shelter

► PEOPLE AGED from seven to 72 can live, 30 at a time for a week or more, in a civil defense shelter under simulated conditions of nuclear attack without serious psychological or social stress.

The presence of a trained manager increased the over-all adjustment, Dr. James W. Altman of the American Institute for Research told the American Psychological Association meeting in New York. The simulated shelter was monitored continuously by sight and sound to determine the occupants' reactions.

Four experimental groups inhabited the shelter. Each consisted of 30 persons, men, women and children. Three groups remained in the shelter one week and the fourth group, two weeks. Experimental variations were in temperature and presence or absence of a trained and designated manager.

Effective temperatures up to 85 degrees Fahrenheit were tolerated but appeared to be close to the upper limit, Dr. Altman reported.

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## Listening Tests Urged

► TESTS to detect the good listener were urged as employment procedure.

A common element in a variety of middle- and high-level jobs is the ability to "meet and deal," Dr. Sidney Adams, psychologist of the U. S. Civil Service Commission, told the meeting of the American Psychological Association in New York. An important part of this is good listening. It is of the utmost importance for a contract negotiator to understand and remember what he hears in conversation.

Some students prefer to learn by listening (to lectures or instructions); others prefer reading, Dr. Adams found. The "readers" do better on a reading comprehension test, but "readers" and "listeners" do equally well on the "listening" test.

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BIOLOGY

# Computer Checks Salmon

▶ A HIGH-SPEED computer has taken a mathematical trip along a salmon's migration route to reveal the salmon's secret: The fish does not need any special "sixth sense" for navigating ability on the high seas to find its way back to the home stream. But once in the stream, the salmon uses smell.

A mathematical analysis of the facts of salmon migration shows that the fish's return to the stream's mouth is only by chance. Even with this gamble, about one out of every five survive, and make the upstream trip. The figure closely agrees with estimates obtained from tagged salmon, Dr. Saul B. Saila, marine biologist at the University of Rhode Island, Kingston, reported.

Dr. Saila spoke at the American Institute of Biological Sciences Symposium on Current Theories of Migration in Lafayette, Ind. Information on migration distances, swimming rates, orientation mechanism and salmon endurance was collected from published scientific reports and fed into a digital computer. A program, which makes the computer "act" as a migrating salmon, was also inserted. By moving the mathematical "fish" haphazardly with little or no orientation, a realistic return, after a 1,200-mile trip at sea, of more than 20% of the fish, was obtained.

Thus the high degree of navigation or precise orientation proposed by many scientists seems "quite unnecessary," Dr. Saila said.

The trip from the feeding ground in the ocean to the stream's mouth is about half the distance to the area where the salmon spawns. In the stream, the fish does switch to its sense of smell and navigational ability to find its way, Dr. Saila emphasized.

Dr. Saila believes the computer has provided the first "working model" that combines all the known data on salmon migration. "The pattern of migration observed in nature is exactly what one would expect from analyzing the computer's data," Dr. Saila pointed out.

• Science News Letter, 80:191 September 16, 1961

## Antibiotic Dissolves Clots

▶ A PENICILLIN-TYPE antibiotic that will dissolve human blood clots was reported at the American Institute of Biological Sciences meeting in Lafayette, Ind.

Dr. Michael A. Pisano, biologist at St. John's University, Brooklyn, N. Y., found that a little known fungus produces several potentially valuable enzymes, including one that dissolves blood clots. Dr. Pisano reported his findings to the Institute's Society for Industrial Microbiology meeting.

In laboratory experiments, enzymes produced from the fungus, *Paecilomyces persimilis*, dissolved blood clots stored in test tubes. Five different strains of the fungus were grown in various nutrient solutions to create the enzymes.

Other experiments show that the enzymes can also dissolve substances such as starch

and gelatin, making the fungus highly valuable as an enzyme source for such industries as baking, brewing and paper products. Enzymes are commonly used in industry to tan leather and in making wine.

The next step will be to study the effects of antibiotic-yielding strains of the fungus on animals before testing on humans, Dr. Pisano said.

The *Paecilomyces* fungi are closely related to the penicillium fungi, from which the well-known penicillin is derived.

• Science News Letter, 80:191 September 16, 1961

## How Fish Form Schools

▶ A SHARPSHOOTING biologist has used an old sniperscope to see how fish form schools in the dark.

Dr. Kenneth R. John of Franklin and Marshall College, Lancaster, Pa., has seen how fishes exposed to a certain amount of light banded together into tight compact schools. The sniperscope, which converts infrared or "invisible" rays into visible images, was used by the scientist for observing in darkness or poor light.

Dr. John studied a fish known as the Mexican banded tetra, whose response to light is considered typical of fish living in lakes and oceans.

While swimming in darkness, the fish moved about with little regard for each other. As light began to filter through the water, the fish formed schools. When the light was nearly a hundredth of a foot candle, all the fish had joined the school. This light is about equal to that of a white surface bathed in moonlight on a clear night.

Organisms that give off light considerably affect the fishes' ability to see and school, Dr. John told the American Society of Limnology and Oceanography meeting in Lafayette, Ind. By eliminating the light-giving (bioluminescent) organisms, the fish could only detect light at shallower depths, and formed schools at even lesser depths.

The meeting is sponsored by the American Institute of Biological Sciences.

• Science News Letter, 80:191 September 16, 1961

## First Chicken Malaria

▶ THE FIRST CASE of chicken malaria has been recorded in the United States.

University of Wisconsin scientists found a malaria parasite in two separate poultry flocks during a routine survey of Wisconsin farms. The parasite is not harmful to humans.

No mysterious poultry disease epidemics have spread in the state yet, but scientists are closely watching for possible outbreaks. The disease is expected to lower production in infected flocks and kill the young birds.

The University of Wisconsin scientists are baffled as to what type of malaria

organisms they are dealing with and how they are transmitted.

The parasite is probably transmitted by mosquitoes commonly found in Wisconsin and not by the species (*Anopheles*) that spreads human malaria. There is no known cure for chicken malaria.

Chicken malaria is a fairly common disease in Asia and South America. The transmission of the disease is very limited, requiring a tiny mite acting as a go-between to spread the disease. The parasite can not be spread to other livestock.

Drs. P. V. Krishnamurti, D. L. Peardon, A. C. Todd and W. H. McGibbon reported their findings to the American Institute of Biological Sciences, Lafayette, Ind.

• Science News Letter, 80:191 September 16, 1961



**GENETICS AT WORK**—Rufus R. Humphrey, of Indiana University, Bloomington, watches the Mexican salamander, the axolotl, whose eggs are being "fertilized" by transplanting nuclei from cells of axolotl embryos. The research was explained at the American Institute of Biological Sciences, Lafayette, Ind.

## EDUCATION

### Corridor Museum Makes Effective Teaching Tool

See Front Cover

▶ A CORRIDOR MUSEUM in the new science building of the State College, Terre Haute, Ind., allows exhibits to be readily seen by students passing by.

The blue-green glass wall that reduces glare was made from blocks produced by the Pittsburgh Corning Corporation to provide light for the "museum."

The exhibits, one of which is seen on the cover of this week's SCIENCE NEWS LETTER, are located on three floors and have already proved an effective teaching tool, because of steady student traffic in the corridors.

• Science News Letter, 80:191 September 16, 1961



## BIOLOGY

## Cave Creature Governed By Daily Metabolic Cycle

► THE CAVE CRAYFISH is a stranger to daylight. He lives deep underground in an environment free from light and temperature changes. Nevertheless, he is probably subject to the same daily metabolic rhythms known to affect the activity of plants and animals living in a normal day-and-night environment on the earth's surface.

This discovery, says Dr. Frank A. Brown, Jr., adds "strong additional support" to the theory that all organisms respond to the universal influence of a 24-hour cycle, timed by the earth's rotation, no matter where they live.

Dr. Brown, a zoologist at Northwestern University, Evanston, Ill., found "a statistically significant 24-hour rhythm of activity," previously unnoticed, while studying records kept on cave crayfish left in constant darkness after their capture.

The eyeless, pigmentless creatures were taken from the River Styx inside Mammoth Cave, Kentucky. Since the cave may have been formed as long as four million years ago, the crayfish have been in darkness for countless generations. Temperature measurements of the river at various times of the year have shown no significant variations.

Energy-producing chemical changes reached their daily peak in the crayfish at about 7 p.m. Minimum metabolic activity occurred at about 9 a.m. Activity from 8 a.m. to 10 a.m. in the morning was less than half that from 6 p.m. to 8 p.m. in the evening, Dr. Brown reports in *Nature*, 191:929, 1961.

This daily rhythm in metabolism, Dr. Brown states, closely resembles that of the incubating chick egg, and is almost identical to that of the fiddler crab, the potato plant and numerous other organisms investigated so far.

• Science News Letter, 80:192 September 16, 1961

## BIOCHEMISTRY

## Poliovirus Toughens to Survive Large Drug Dose

► THE POLIOVIRUS can become so tough that it can survive a drug dosage 10,000 times that required to stop its ancestors.

The wild Mahoney poliovirus can develop such resistance, Drs. Joseph L. Melnick, Derek Crowther and Julio Barrera-Oro of Baylor University College of Medicine in Houston, Texas, reports. So can the attenuated LSc strain, "the very virus used in the oral polio vaccine."

Both of these strains have built up resistance to guanidine hydrochloride, a potent inhibitor of poliovirus multiplication, in the test tube, and the Mahoney strain has become resistant while living in monkeys.

Whether inside the monkey or out, the resistance builds up when the virus has to

grow in the presence of the drug. Each generation becomes a little tougher than the last.

No one knows just how the viruses do it, but the process of developing resistance probably is similar to the build up of resistance in bacteria. This resistance creates a possible difficulty in developing an efficient drug to combat the virus, the researchers report in *Science*, 134:557, 1961.

The findings should not alarm persons who have had poliovirus vaccine. The Salk shots contain only killed virus, and the poliovirus in Sabin oral vaccine is in no danger of becoming resistant to guanidine hydrochloride. This drug is too toxic to be given to humans.

• Science News Letter, 80:192 September 16, 1961

## TECHNOLOGY

## Solar Heating Proves Costly in New England

► SOLAR HEATING EQUIPMENT costs more than can be justified by fuel savings in a suburban home in New England.

Massachusetts Institute of Technology engineers have reached this and other conclusions from detailed records of three years' experience with their fourth solar house. Their findings were reported by Prof. Alfred G. H. Dietz at the United Nations Conference on New (non-nuclear) Energy Sources, in Rome.

Sunshine hitting the roof of this particular three-bedroom suburban house provided two-thirds of the energy required to heat it and gave an adequate hot water supply. Claremont D. Engebretson, a mechanical engineer, and his family occupied the home throughout the last three years. It will now be converted into a conventional home and sold.

"In countries where conventional fuels are abundant," Prof. Dietz told the United Nations Conference, "the use of solar energy for heating is economically attractive only where there is an unusually high yield of sunshine per square foot."

The energy collector of this particular solar house, in Lexington, Mass., was 16 by 40 feet and consisted of two layers of glass over a thin aluminum sheet painted black. It was set at an angle of 60 degrees and served as one wall of the house.

Water pumped through copper tubes attached to the aluminum sheet was heated by the trapped solar energy and stored in a 1,500-gallon tank in the basement. Hot water was pumped through a heat exchanger to transfer heat from the water to air, and the warm air was forced into the living rooms through ducts.

The experience gained in constructing and operating this unit, Prof. Dietz believes, will some day be valuable. It would be feasible, he said, to heat a house solely by a solar system even in the random weather of New England, but more storage space would be required than could conveniently be provided in a small house.

M.I.T. researchers now expect to concentrate on problems that can be explored without a full-scale house.

• Science News Letter, 80:192 September 16, 1961

# IN SCIENCE

## CHEMISTRY

## Ethane Found Useful In Tritium Measurements

► A NEW METHOD of measuring the radioactivity of tritium, a hydrogen isotope, with ethane, a gaseous hydrocarbon, is being used at the University of California's tritium laboratory at La Jolla.

Three researchers in the University's chemistry department point out that much larger amounts of hydrogen, the only gas used to date for counting gas-phase tritium, can be put into a counter when the hydrogen is first converted to a hydrocarbon. The need for enrichment with tritium is lessened and the resulting measurements are more accurate, they state.

Drs. A. E. Bainbridge, Paula Sandoval and H. E. Suess report in *Science*, 134:552, 1961, that ethane, synthesized by mixing hydrogen with acetylene over a colloidal palladium catalyst, has "ideal" counting characteristics for low-level tritium activity.

The amount of radioactivity of tritium is used to date the age of recent air and water samples.

• Science News Letter, 80:192 September 16, 1961

## METEOROLOGY

## Women's Names Win out As Hurricane Designation

► WITH HURRICANES Betsy and Carla kicking up a fuss, U. S. weathermen have again been working their way through the list of women's names to dub hurricanes.

Following in the footsteps of Hurricane Anna, future hurricanes this year will carry names ranging from Debbie and Esther all the way to Tanya, Virgil and Wenda if the need should arise. Girl's names have been used since 1953 to identify tropical storms in the Atlantic Ocean, Caribbean Sea and Gulf of Mexico.

Experience has shown that using girl's names produces less errors while broadcasting or transmitting hurricane news than the older, more cumbersome method of latitude and longitude position. The system is also shorter and quicker.

Last year the U. S. Weather Bureau adopted a system of using the same set of names every four years. If a major hurricane sweeps through the United States causing extensive damage and loss of life, the name assigned to it is put in mothballs for 10 years. Hurricane Donna last year thus far is the only unhappy holder of this distinction.

Some persons have suggested that hurricanes be designated by numbers (1-2-3), animals (antelope-bear-coyote), or by boy's names (Arthur-Ben-Christopher), but the female sex has won the male weathermen over.

• Science News Letter, 80:192 September 16, 1961



# EN FIELDS

## BACTERIOLOGY

### Germs That Enjoy Heat Threaten Food Spoilage

► **HEAT-LOVING** bacteria that threaten potential food spoilage trouble in connection with the present increase of the automated dispensing of hot-prepared foods are being studied in various parts of the world, it was learned at the Tenth Pacific Science Congress in Honolulu.

The thermophilic bacteria can cause food loss even in canned food that has been improperly cooled after processing. The microorganisms can grow rapidly at unusually high temperatures.

Dr. Hilmer A. Frank of the University of Hawaii's department of food processing and utilization discussed basic work on the methods of spoilage and the enzyme systems, the factors affecting spore formation and growth, and other phases of the development of heat-loving bacteria.

Several antibiotics alone and in conjunction with heat may be the practical solution of combating the food spoilage microorganisms. These and other possibilities are being explored.

Heat usually kills germs but in some cases the particular kinds that actually enjoy high temperatures have been found growing merrily in natural hot springs of relatively high temperature.

• Science News Letter, 80:193 September 16, 1961

## OCEANOGRAPHY

### Huge Fault in Ocean Floor Moves 720 Miles

► **A HUGE SCAR** in the ocean floor has moved 720 miles. However, it took 100,000,000 years to do it.

Magnetic surveys conducted by United States ships off the California coast have shown that rocks along the Mendocino fault have moved eastward at a speed of approximately one-half an inch per year. The movement stopped many millions of years ago.

Ships cutting through the ocean waters measured changes of the earth's magnetism caused by the rocks in the ocean floor. By matching the magnetic "grain" of the rocks north and south of the fault, the direction and extent of movement can be measured.

A sister fault, roughly paralleling the Mendocino scar, has moved about 150 miles, making a total displacement of 870 miles. The faults probably once extended right into California, but years of erosion have wiped out all evidence.

The large displacements along the faults strongly agree with data supporting the continental drift theory. Many scientists believe the continents of the world have been drifting apart for many millions of years.

The geomagnetic surveys were first con-

ducted by Scripps Institution of Oceanography aboard the U. S. Coast and Geodetic Survey ship, *Pioneer*, and later extended by Scripps ships, Drs. Victor Vacquier, Arthur D. Raff and Robert E. Warren report in Geological Society of America Bulletin, 72:1251, 1961.

Except for the rumblings along these east-west faults, the northeastern Pacific Ocean floor "has been relatively quiet since some time in the Paleozoic era," which ended about 230,000,000 years ago, the scientists report.

Large movements along faults have also been recorded on land. Movement along the San Andreas fault in California, cause of many earthquakes that shock the state, has been about 350 miles in the last 130,000,000 years.

• Science News Letter, 80:193 September 16, 1961

## BIOCHEMISTRY

### Enzyme Action Puzzle May Soon Be Solved

► **THE MYSTERY** of how enzymes speed up chemical reactions in living things is on the verge of discovery according to Prof. Frank H. Westheimer, chairman, chemistry department, Harvard University.

Enzymes are giant proteins within the cells composed of thousands of atoms. At body temperatures they catalyze chemical reactions that scientists in laboratories can duplicate only at very high temperatures and with the assistance of strong acids, alkalis and other chemicals.

The complexity of enzymes makes experimenting directly with them extremely difficult. Prof. Westheimer and others have devised "chemical models," simple chemical compounds that in essential ways mimic the reactions of certain enzymes, with which to study the actions of enzymes.

Prof. Westheimer told the Fifth International Congress on Biochemistry in Moscow that two enzymes are particularly important. They are ribonuclease which catalyzes the break up of ribonucleic acid (RNA), and alcohol dehydrogenase, which transfers hydrogen atoms from sugar, starch and other substances to coenzymes, or special carrier molecules.

Ribonuclease is the first enzyme whose number and precise arrangement of amino acid building blocks is known, and a three-dimensional model of this molecule has been constructed. However, there is much yet to be solved about the workings of this enzyme.

Every region in an enzyme is not active in catalysis. The "active sites" of ribonuclease are under study, as are the significance of the coiling and folding of the long molecule.

Although much is known about how alcohol dehydrogenase works, the arrangement of its amino acids is still a puzzle.

As progress in the field continues, Prof. Westheimer noted, the theory of enzyme action will become secure and chemists may be able to create synthetic catalysts like enzymes in the laboratory.

• Science News Letter, 80:193 September 16, 1961

## CHEMISTRY

### Crystal Growth Method For Improving Masers

► **SCIENTISTS** have developed a crystal-growing technique that will improve the already amazing performance of masers and optical masers, the devices that can amplify a pinpoint frequency of sound or a narrow band of light hundreds of times.

The currently used method of growing artificial crystals yield crystals that are under considerable strain, with the internal structure distorted, and the two beginning materials are not evenly distributed.

Such imperfections are tolerable when the crystals are used as jewel bearings or as phonograph needles. But masers need a crystal of better quality.

The new technique, developed by E. A. D. White of the General Electric Co., Ltd., Wembley, England, produces "good-quality" crystals of pure corundum or ruby (corundum and chromium) by dissolving the materials in lead fluoride. The whole process is carried out in a platinum crucible heated in a laboratory furnace. As the solution cools slowly, it crystallizes.

In some cases, Dr. White reports in *Nature*, 191:901, 1961, lead fluoride gets inside the crystal. But most of the crystals are clear and free of strain.

"The incorporation of high concentrations of paramagnetic ions," a highly desirable feature for crystals used in masers, is easily achieved with the new method.

• Science News Letter, 80:193 September 16, 1961

## PUBLIC HEALTH

### Process Removes 98% of Strontium-90 From Milk

► **SHOULD** the United States be hit by a nuclear attack, the milk supply, at least, could be made safe. The Agricultural Research Service, the Atomic Energy Commission and the U. S. Public Health Service have developed a process that removes 98% of the strontium-90 from milk.

The technique used is a complicated version of the water softening process: Citric acid is added to cold raw milk to ionize all the strontium. (Without the acid, only 60% of the strontium would be in ionized form.) The milk-acid mixture is then poured through tall columns containing an ion-exchange resin that essentially snatches the strontium ions out of the milk as it flows by.

The remaining steps are merely clean-up chemistry: The milk is treated with potassium hydroxide (an alkali) to neutralize the acid, then pasteurized and homogenized. Water added with the acid and alkali is removed by flash heating the milk in a vacuum chamber.

The process is now being tested on a pilot-plant basis at the U. S. Department of Agriculture's research center in Beltsville, Md., the developers report in *Agricultural Research*, 10:14, 1961.

• Science News Letter, 80:193 September 16, 1961

## SURGERY

# New Surgery Restores Hearing

Thousands are able to hear through new surgical procedures developed with modern high-powered binocular microscopes, Faye Marley reports.

► NEW SURGERY is successful in restoring many persons hard of hearing to a world of almost normal sound.

Ear doctors, called otologists, are quick to say that all operations are not successful and that "perceptive" or nerve deafness cannot be helped at all. But even the hearing aid salesmen are sending some types of patients to be examined for possible surgery.

Hearing loss caused by otosclerosis (immobilization of the middle ear bone) is believed by some to be one of the most common causes of hearing loss in adults. But this condition can often be remedied by the new microsurgery that allows surgeons to see the tiny stapes bone, as small as a grain of rice.

The binocular operating microscope has been in use in this country only within the past few years. It magnifies the parts of the middle ear 40 times, so the ear surgeon can see what he is doing.

## Performed Throughout U.S.

Dr. David Myers of Temple University Medical Center, Philadelphia, told SCIENCE SERVICE that the stapedectomy is being performed throughout the United States and also in many parts of the world.

His rough guess is that a possible 2,000,000 to 3,000,000 persons in the world suffer from otosclerotic deafness, and that only an estimated 200,000 have had microsurgery for this disease. This is because few people know about this new technique.

Also binocular operating microscopes are in limited use and many people who have otosclerotic deafness are content to wear hearing aids.

Eminent otologists who are members of the Pennsylvania Academy of Ophthalmology and Otolaryngology report that the percentage of successful results has been uniformly high. A review of more than 1,000 operated patients at Temple showed approximately 77% have gained hearing within normal limits and that more than 90% are given socially useful hearing following stapedectomy.

These results are confirmed by Dr. Fred Harbert of Jefferson Medical College Hospital, Philadelphia, and by Dr. Raymond Jordan at the Pittsburgh Eye and Ear Hospital, both of whom report similar success with the stapedectomy.

Dr. John J. Shea Jr., an ear, nose and throat specialist in Memphis, Tenn., perfected the stapedectomy five years ago and devised many of the instruments necessary to perform it.

This is the way the operation is performed: With the aid of the operating

microscope, the surgeon makes an incision along the ear canal adjacent to the middle ear where the diseased stapes is located near two other tiny bones. Because the stapes has become immobilized, or fixed, the waves that conduct sound are blocked before they reach the inner ear. The surgeon lifts the ear drum like a curtain and folds it over during the stapedectomy.

In the operation the diseased stapes bone is removed and a tiny length of polyethylene plastic tubing is used to re-establish the continuity of the middle ear sound-transmitting mechanism. Dr. Harbert and others are using vein grafts, vein or fat plugs, and stainless steel wire to construct an artificial stapes.

Most patients can carry on their usual activities two weeks following the operation.

Dr. Harold F. Schuknecht of Henry Ford Hospital, Detroit, and numerous other ear doctors agree that a partial or complete stapedectomy is the preferred surgical procedure to correct otosclerotic deafness.

Microsurgery is also being used to correct and improve other middle ear diseases. The perforated eardrum and chronic ear infections are among conditions that can be helped. Serious otitis media in children is also corrected by microsurgery.

The surgeon uses what are called "tympanoplasty" procedures to remove every bit of diseased tissue from the middle ear. Then, using the remaining healthy bones and tissues, he rebuilds a new middle ear mechanism that can again function to conduct sound to the hearing nerve.

Dr. Woodrow Schlosser, also of Temple University, says that if the disease in the middle ear is not too extensive, tympanoplasty can restore socially practical hearing to 60% of the patients who undergo the operation. The same patients are given a "dry ear," in place of the intermittent drainage that is often caused by chronic infection.

## "Window" Operation Used

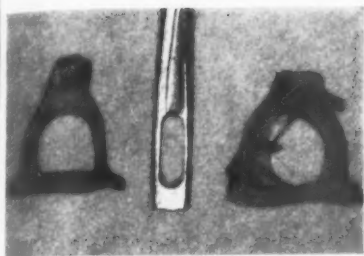
Before Dr. Shea perfected the stapedectomy, some success had been reported with the fenestration (window) operation in which a new opening was produced in the inner ear, permitting sound waves to bypass the diseased bone. Many thousands have had excellent results from this operation.

It was Dr. Samuel Rosen, however, at Mt. Sinai Hospital, New York, who in 1952 ushered in a new era in the treatment of deafness. He called his operation stapes mobilization, and when successful, the operation gave a higher level of hearing than the fenestration procedure.

In spite of the success of stapes mobilization, some patients pass through a period of improved hearing and then suffer a re-



**CAN HE HEAR?**—A Johns Hopkins Medical Center ear doctor (otologist) examines a young child.



**STIRRUP-LIKE BONE**—The stapes in the middle ear can become fixed or hardened (right) and cause hearing loss. Normal stapes (left) is shown with enlarged needle to indicate size.

turn of deafness. The stapedectomy in many instances can correct this failure.

A new Public Affairs Pamphlet, "You and Your Hearing" by Dr. Norton Canfield of Yale University School of Medicine, explains the various types of hearing loss—conductive, perceptive, and mixed deafness, as well as psychological.

"Some people do not wish to hear," Dr. Canfield says. "Some have their mind so occupied that perception centers do not react normally. A few people feign deafness."

Tests have shown that about three percent of the young people in the United States under 20 years of age have abnormal hearing. Dr. Canfield says that about two-thirds of this group are affected seriously enough to require medical aid.

"More than half of the children who have some hearing loss can have normal hearing after proper treatment," the Yale otologist says.

It is well known that many infectious diseases such as scarlet fever, measles,

mumps, pertussis, influenza, pneumonia, typhoid fever, diphtheria, a common cold or any disease causing high fever can produce hearing difficulties. The new antibiotics have done much to alleviate the effects of these diseases.

But for many old people and those with nerve deafness that medicine and surgery cannot help, the hearing aid remains the principal avenue to auditory contact with the outer world of sound. Speech or lip reading, along with speech training, may be advised.

Dr. Canfield, who is on the advisory board of the American Hearing Society, advises no one to wear a hearing aid until his doctor has examined him.

Dr. Canfield especially warns against itinerant hearing aid salesmen, adding that there is "no more gullible group than those who do not hear well." Peddlers and unauthorized companies should be avoided, and all hearing aid recommendations should be checked with the ear doctor.

In a sense, Dr. Canfield points out, everyone uses hearing aids. Telephones, radios, television sets, sound movies, tape recorders, public address systems, hi-fi machines, walkie-talkies and electric baby sitters are all real aids to hearing that we do not hesitate to use.

"Yet in the use of a personal hearing aid there may be reluctance so strong that many people wait too long for their best interest," he says. "The modern hearing aid is truly one of the electronic marvels of the age."

Dr. Canfield's pamphlet, which was prepared in cooperation with the American Hearing Society and the Royal Neighbors of America, can be obtained by writing to Public Affairs Pamphlets, 22 East 38th Street, New York 16, N. Y. The price is 25¢ each.

• Science News Letter, 80:194 September 16, 1961

#### PUBLIC HEALTH

## Alcohol Link Not Proved

▶ THE IDEA that dependent persons tend to become alcoholics "is still premature," according to a University of Cincinnati psychology professor and two research associates.

Experiments conducted by Dr. Alfred Kristofferson, Willard Bailey and Frank Hustmyer at Longview State Hospital, Cincinnati, Ohio, show that organic brain damage without accompanying alcoholism causes a larger degree of dependence than that evidenced by brain-damaged alcoholics.

Tests in "perceptual dependence" suggest that alcoholism and dependence are associated because dependence results from an organic impairment produced by drinking, rather than being present before the person turns alcoholic, they conclude.

Such tests require the subject to keep an item separate from the visual field surrounding it—in this case, a luminous rod surrounded by a luminous frame.

Two rod-and-frame tests are described in

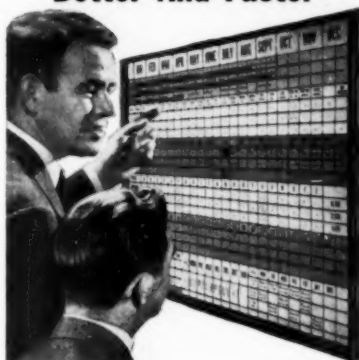
the current Quarterly Journal of Studies on Alcohol, 22:387, 1961. In the first, the researchers used a group of brain-damaged alcoholics, a group of "dry" alcoholics who had not had a drink for a year or more, and two control groups with no history of alcoholism. Both the brain-damaged and the "dry" alcoholics showed a much higher level of dependency than the control groups.

In the second tests, the three groups consisted of brain-damaged non-alcoholics, "disturbed" alcoholics with little or no brain damage, and hospitalized schizophrenics with no history of alcoholism.

The schizophrenic group scored about the same as the "normal" control groups in the first test. The sociopathic alcoholics "performed very nearly the same" as the "dry" alcoholics. The brain-damaged non-alcoholics "showed by far the largest degree of dependence."

• Science News Letter, 80:195 September 16, 1961

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# Books of the Week

For the editorial information of our readers, books received for review are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C.

ADVANCES IN FLUORINE CHEMISTRY, Vol. 2—M. Stacey, J. C. Tatlow and A. G. Sharpe, Eds.—*Butterworths*, 220 p., illus., \$8. On the thermochemistry of organic fluorine compounds, fluorine resources and utilization, mass spectrometry of fluorine compounds and other recent research.

ADVANCES IN GEOPHYSICS, Vol. 7—H. E. Landsberg and J. Van Mieghem, Eds.—*Academic Press*, 333 p., illus., \$11. Covers research in the fields of atmospheric tides, characteristics of stratospheric properties, arctic meteorology and other topics.

ATLANTIC CROSSINGS BEFORE COLUMBUS—Frederick J. Pohl—*Norton*, 315 p., illus., \$4.50. Reconstruction of possible pre-Columbian crossings, bringing together a wide range of controversial evidence in considerable detail.

BUSH FLYING IN ALASKA—Charles Coombs—*Morrow*, 95 p., illus. by Morgan Henninger, \$2.95. Tells boys about the hazardous profession of small aircraft pilots in remote land areas.

CARTER'S PRINCIPLES OF MICROBIOLOGY—Alice Lorraine Smith—*Mosby*, 4th ed., 603 p., illus., \$6. Fully revised and updated text, emphasizes the value of a knowledge of microbiology in everyday life.

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THE GLORIOUS OYSTER—Hector Bolitho, Ed., scientific chapters by Maurice Burton—*Horizon Press*, 174 p., illus., \$4.50. Historical, scientific, artistic and culinary reflections on the succulent bivalve.

INTERNATIONAL REVIEW OF CYTOLOGY, Vol. XI—G. H. Bourne and J. F. Danielli, Ed.—*Academic Press*, 356 p., illus., \$11. On the fine structure of insect sense organs, cytology of developing eye, histochemistry of ossification and other topics.

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SCIENCE AWAKENING—B. L. Van der Waerden, transl. from Dutch by Arnold Dresden—*Oxford Univ. Press*, 306 p., illus., \$7.50. A history of Egyptian, Babylonian and mainly Greek mathematics, based on original sources, for mathematicians and the mathematically inclined general reader.

SCIENTIFIC MANPOWER 1960: Symposium on Sociology and Psychology of Scientists—Samuel Schenberg, Chmn.—*NSF (GPO)*, 52 p., paper, 40¢. Highlights and papers read at the ninth Conference on Scientific Manpower.

SPACE POWER SYSTEMS—Nathan W. Snyder, Ed.—*Academic Press*, 632 p., illus., \$6. Selection of technical papers based mainly on a Symposium of the American Rocket Society, held at Santa Monica, Calif., September 1960.

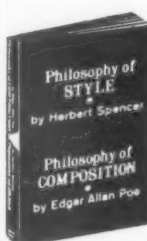
TEENAGERS WHO MADE HISTORY—Russell Freedman—*Holiday House*, 272 p., illus. by Arthur Shilstone, \$3.50. Biographical sketches of Werner von Braun, Samuel Colt, Louis Braille and Galileo Galilei, among others.

TELEVISION FOR SCHOOL SCIENCE: Report on OEEC Seminar, Ashridge (England), July 1960—OEEC, 181 p., paper, single copies free upon request direct to Organization for European Economic Co-operation, 1346 Connecticut Ave. NW, Washington, D. C. Report on the present status of school television in Western Europe.

• Science News Letter, 80:196 September 16, 1961

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## INVENTION

# Patents of the Week

An irradiation process that changes the color of diamonds by rearranging their crystal structure has been patented to make yellow and brown stones more valuable.

► **PUBLIC TASTE** makes colorless or bluish diamonds more valuable than pale yellow or brown diamonds. To put yellow and brown stones in a higher price range, three inventors have patented an irradiation process that changes the color of diamonds by rearranging their crystal structure.

Patent No. 2,998,365 was issued to Jan F. H. Custers, Johannesburg, Union of South Africa, and Henry B. Dyer and Robert W. Ditchburn, both of Reading, England. Rights were assigned to Industrial Distributors Limited.

Brown or yellow diamonds get their natural color by absorbing excessive amounts of light towards the violet end of the visible spectrum, probably because of impurities acting as absorption centers. Irradiation, the inventors explain, reverses the process and makes the diamond absorb light toward the spectrum's opposite, or red, end.

Although complete decoloration to pure white is "all but impossible," the brown and yellow color can be diluted sufficiently to give a stone considerably more value than it had originally, they reported.

The method involves exposing the diamond to gamma rays, then heating it to about 842 degrees Fahrenheit to "fix" the altered color.

To add to the strength and shock resistance of plastic eyeglass frames, especially when roughly handled by children, John D. Baer of Attleboro, Mass., invented a frame with the upper "brow bar" reinforced with a curved strip of metal. The metal is embedded in the bar so that it is "concealed from the view of a casual observer when the glasses are in use." Rights to patent No. 2,997,917 were assigned to the Bishop Company, North Attleboro, Mass.

A two-wheeled cart for delivering logs to fireplaces won patent No. 2,998,151 for Irvine O. Sampson, Hood River, Ore. The cart has a pusher bar to shove the logs onto the fireplace andirons, and a curved, lever-operated "hold down finger" to keep them in place until the operator is ready to drop them. The finger mechanism can also be used to pull unburned logs out of the fireplace.

• Science News Letter, 80:197 September 16, 1961

## TECHNOLOGY

## Energy Sources Explored

► **MORE THAN 500** representatives from 70 nations attended the United Nations Conference on New Sources of Energy in Rome.

The Conference examined practical ways of using the sun, the wind and underground steam for energy production, especially in underdeveloped countries lacking conventional fuel sources and advanced technologies. World energy consumption is expected to grow even more rapidly than world population, which may double by the year 2000.

Some 250 scientific papers, ranging in subject matter from harnessing underground geothermal energy for heating purposes to studies of suitable sites for windmills, were submitted.

The papers were summarized in 20 general reports by specialists from 13 countries—the United States, the Soviet Union, Spain, Algeria, India, Japan, Israel, France, England, the German Federal Republic, Iceland, Mexico and New Zealand. These reports served as the basis for discussions at general sessions. Two broad groupings for later technical sessions involved the use of solar wind and geothermal energy for purposes of power production, and the use of solar energy alone for other purposes such as cooking, heating, producing fresh water from salt water, and industrial processing.

Among the United States delegates was

Harry E. Thomason, an Army Signal Corps patent advisor who devised a system for heating his Washington, D. C., home by using the sun's energy. He was selected by the National Science Foundation to report to the Conference on his project.

Mr. Thomason's system, built for \$2,500 as part of the cost of a \$13,000 three-bedroom home, employs a solar heat trap 28 feet long and 22 feet high on the back of the house. Heat stored on sunny days is used during extended periods of cloudy weather. The system is also used for summer air conditioning. Surplus heat warms a 2,000-gallon outdoor swimming pool.

• Science News Letter, 80:197 September 16, 1961

## BACTERIOLOGY

## New Salmonella Species Has Been Isolated

► **A NEW SPECIES** of *Salmonella*, a genus of bacteria causing acute intestinal inflammations, has been isolated from cattle by scientists at the Uttar Pradesh College of Veterinary Science and Animal Husbandry, Mathura, India. It has been named *Salmonella mathura* and is being investigated to determine characteristics. Examination of 2,970 domestic animals also disclosed 16 known *Salmonella* types, including several believed previously encountered only in humans, V. K. Sharma and C. M. Singh report in *Nature*, 191:622, 1961.

• Science News Letter, 80:197 September 16, 1961

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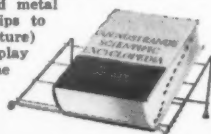
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# MINING

## Prospector Replaced By Mechanical Digger

► A MECHANICAL gold digger that threatens to make the grizzled prospector extinct is now operating in the Western deserts.

A portable dredge is sifting gold desert sands near Tucson, Ariz. The tiny gold particles are electrostatically separated from the sand after all moisture is driven off.

Placer gravel is first broken into smaller pieces and screened. Heaters sending a dry stream of air over the gold particles charge the particles, causing them to stick to a screen. The waste material is then blown away, it is reported in the Engineering and Mining Journal, 162:79, 1961.

The dredge was developed by Kelsey Boltz and Donald Wright of United Placer Industries. It is expected to allow profitable extraction of gold-bearing desert lands that have previously been uneconomical to operate.

• Science News Letter, 80:199 September 16, 1961

# BIOLOGY

## Hamsters Prefer Alcohol, Guinea Pigs Like Water

► AMONG SIX animal species studied by two scientists from the University of Helsinki, Finland, hamsters clearly preferred alcohol to water.

Guinea pigs drank mostly water. Hedgehogs preferred water but sometimes they drank enough alcohol to appear slightly drunk. Rabbits drank about as much of one as the other, not being able to distinguish between the taste, apparently.

Rats have an aversion to alcohol and not merely a relative preference for water. If alcohol is the only solution available, the amount of fluid the rats consume is lower than when plain water is available.

But rats as well as mice sometimes change their preference during the experiments.

Drs. Alpo Arvola and Olof Forsander report in Nature, 191:819, 1961, that the reason for preference or aversion to alcohol among animals is not known. How-

ever, Dr. Forsander believes the choice of alcohol can be explained by differences in metabolism in the animal.

• Science News Letter, 80:199 September 16, 1961

# SPACE

## Capsule Recovered, Two Satellites Down

► DISCOVERER XXIX, the latest in the Air Force series testing the Agena vehicle for ejection and recovery of space capsules, was successfully launched Aug. 30.

The capsule to have been recovered in mid-air was instead fished out of the sea Sept. 1 by stand-by crews. The gold-plated capsule carried biological specimens of live tissues for studies of effects of radiation on living matter. The Agena vehicle is still in orbit.

A satellite designed to determine how hazardous micrometeoroids are to space travel was launched by the United States Aug. 25. (See SNL, 80:70 July 29, 1961.)

The 127-pound Explorer XIII, originally slated as Explorer XII, was launched at Wallops Island, Va., by a four-stage, 36,600-pound Scout rocket. It carried equipment to detect and report hits by tiny particles believed to be debris from exploded planets or comets. It stayed in an orbit of 174 to 606 miles above the earth for three days. The satellite was originally planned to stay up for a year in an orbit of 280 to 610 miles.

The Ranger I, launched Aug. 23, that should have traveled 685,000 miles into space as a forerunner for moon probes came down on Aug. 30. Difficulties during launch sent the Ranger into an earth orbit of 105 to 312 miles.

• Science News Letter, 80:199 September 16, 1961

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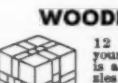
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# • New Ideas and Gadgets •

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• **THREE-WHEELED SCOOTER** suitable for duties or pleasure will hold a large basket or golf bag and can be adapted to pull a lawn mower. Weighing only 177 pounds, its steering handle, seat and front wheel lift off for transportation in a car. The three-horsepower scooter can travel up to 16 miles per hour. A single foot pedal controls the accelerator and brake.

• Science News Letter, 80:200 September 16, 1961

• **BATHTUB SECURITY RAIL** recommended especially for the aged, infirm and handicapped helps to prevent accidents while getting in or out of the bathtub. The chrome-plated, heavy duty steel rail adjusts to all sizes of tubs and is rubber protected at contact points.

• Science News Letter, 80:200 September 16, 1961

• **WRITE-ON WIRE MARKERS**, useful in prototype operations or production work where many different legends are needed, are self-adhering and self-laminating. Partly a write-on marker and partly transparent, the clear portion wraps around itself and over the written code applied on the wire, assuring permanent legibility.

• Science News Letter, 80:200 September 16, 1961

• **TALKING DOLLS** in the images of three stars of a children's TV show speak 11 different sentences at the pull of a string, each with its own distinctive vocabulary and vocal personality. The dolls, shown in



the photograph, have soft bodies and plastic heads in which the voice units are sealed.

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• **REMOTE HANDLING TONGS** with pistol grip and locking device allow safer handling of explosives, radioactive substances and toxic materials. They can be used to lift, pour or mix, and can be operated as simple hand tongs, or mounted

in ball swivel joints, from behind shields. Interchangeable heads include parallel and curved jaws, screwdrivers, saws and winches.

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• **PORTABLE FIRE EXTINGUISHER** with a new multi-purpose dry chemical as the extinguishing agent can be used against flammable liquids, electrical fires, wood, paper and other combustibles. Available in different models containing from 8½ to 25 pounds of chemical, conversion kits are offered for certain models now in use.

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• **AUTOMATIC INCUBATOR** for classroom use is a 12- by 18-inch clear plastic box visible from all directions. It comes with egg turning equipment. Its removable specimen compartment is also suitable for cultures, and seed germination study. Two 40-watt bulbs give thermostatically controlled temperatures ranging up to 150 degrees Fahrenheit.

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• **ELECTRIC COFFEE MILL** makes it possible to grind coffee as needed and to the desired fineness. To operate, the coffee beans are placed in the metal cup of the 110-volt grinder, a button pressed and held down for about 20 seconds, or longer for a finer grind.

• Science News Letter, 80:200 September 16, 1961



## Nature Ramblings



## Do You Know?

► **WHETHER THEY BURROW**, swim or climb trees, all snakes continue to grow throughout their lives. At certain intervals, usually three or four times a year, the skin becomes too tight and it must be shed.

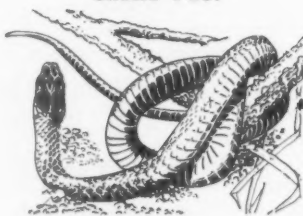
This process is somewhat similar to what happens when a human gets a sunburn and the top layer of skin peels off in sizeable sheets. Like the sunburned human, the snake does not slough off the full thickness of the skin, but only the paper-thin, inelastic, top-layer known as the epidermis.

Before peeling, the animal becomes sluggish and stops eating. The skin itself, which is not in the least slimy, looks dry and the colors become drab and dirty.

For ten days or two weeks, the snake behaves as if it were ill. During this time, a new epidermis is being formed, and the major energy of the body seems to be devoted to this task.

Then one day, the snake comes out of its torpor. The old outer skin has regained its transparency and the colors appear brighter

### Snake Peel



as a secretion pours out beneath it and loosens it along the entire body length.

The snake then begins roving about, restlessly rubbing its snout against rocks, trying to peel back the front end of the skin.

It finally succeeds and simply crawls free, with colors glistening as if it had been dipped in oil.

The old skin, frequently in one piece, now useless is left behind.

• Science News Letter, 80:200 September 16, 1961

One out of every three of Canada's manufacturing establishments employ chemical processes and make products essentially chemical in nature.

Suggestibility alone can create a feeling of improvement among a large proportion of hospitalized psychiatric patients.

Almost 1,000,000 teen-agers sought but were unable to find work in June, 1961.

A new steroid successful in the treatment of hay fever, bronchial asthma, rheumatoid arthritis and other allergic and inflammatory conditions has been reported.

Many farmers now have a year around supply of fresh feed for their animals by growing in hydroponic trays grass that is ready to harvest every six days.

Paper is one of the most frequently used items in modern life.

• Science News Letter, 80:200 September 16, 1961



